0010.0085

From:	"Tim Hsieh" <tim@mh2law.com>
To:	"Doreen Sasaki" <dsasaki@mh2law.com>
Subject:	FW: Potential New Xerox Patent Applications (MHH 12-11-07)
Attachments:	20070891.doc, 20071047.doc, 20071224.doc, TAP comments.doc

Date: Tuesday, December 11, 2007 10:16 AM

HTML | Plain Text | Header | Raw Content

Please stick these instructions on the front of the file. Thanks.

Docketed
Draft Due: 2/11/08
File Proj: 3/11/08
DMS

From: Mcmillan, Gail [mailto:Gail.Mcmillan@xerox.com]
Sent: Tuesday, December 11, 2007 10:00 AM
To: tim@mh2Law.com
Cc: Bade, Annette
Subject: FW: Potential New Xerox Patent Applications (MHH 12-11-07)
Importance: High

Tim,

20071224-US-NP's inventors are from XRCC (Xerox Canada). Annette Bade has requested that you send the draft patent application to her for review BEFORE sending it to the XRCC inventors.

Please acknowledge these instructions.

Thank you,
Gail

From: Mcmillan, Gail
Sent: Tuesday, December 11, 2007 9:55 AM
To: tim@mh2Law.com
Subject: Potential New Xerox Patent Applications (MHH 12-11-07)
Importance: High

Dear Tim,

Accompanying this letter is the Xerox File listed below. Please review each file, including the TAP comments, the prior art noted, and references to related Invention Disclosures and other Xerox Files to determine the status of related files, to determine if the subject matter of the file is in your area of expertise and to ensure that your firm will not have a conflict of interest or other issues when preparing, prosecuting, and issuing a patent application based on that file. For each file inactivated at minimum costs, we will provide you with two replacement files.

Within three (3) months at the latest from the date of this letter, please file high quality, complete, non-provisional utility patent applications with the USPTO, in accordance with previously agreed upon costs, and proceed per the *Xerox Outside Counsel Docketing Guidelines*. All USPTO fees are not to exceed $1600 and are to be charged to Xerox Deposit Account 24-0037.

In the event that it is believed by you that the agreed upon cost, or cost range, per application (as recited below) will be exceeded, before continuing, please obtain

specific written approval from your **Xerox Liaison Attorney**. Also, as agreed for inventions of lower value, such as with a TAP rating of below 4, it is expected that your costs will be lower than the agreed upon average per application; for inventions of higher value, TAP 4 and above, it is expected that your costs will be as agreed. Also, for related inventions, especially where some of the same background can be used, your costs per application should be less than the average for subsequent applications. For all TAP-rated 3 inventions, please include a total of 20 claims and 3 independent claims; for higher value inventions, include 4 independent claims and a total of about 25 to 30 claims, noting the substantial added costs for each claim exceeding 20. When appropriate, there is to be a dependant claim directed to a xerographic system. Further, please minimize the number of sheets of drawings and try not to exceed about 5 sheets, but if you need more for legal reasons, then proceed.

Before you begin the preparation of a first draft, please contact the lead, usually first inventor listed on the ID. We encourage your face-to-face meetings with inventors, being mindful of the costs. If problems arise in contacting or receiving cooperation from any inventor, contact me, or your Xerox liaison attorney, as soon as possible. Should you not receive sufficient cooperation/comments from the listed inventors after you have made two attempts, please provide them with a communication which indicates that they are obligated to cooperate, and that you will either proceed without their comments and signatures, or that the file will be inactivated and a patent application not filed thereon.

All docketing responsibilities, timely requesting a search, timely requesting an examination, reside with your firm; no extensions of time, very few, if any refilings, no abandonments. Prosecution responsibility for the U.S. and foreign counterparts of patent applications that your firm prepares will reside with your firm. After foreign counterpart applications are filed by the Xerox Foreign Docket Coordinator, the foreign files will be sent to your firm to handle prosecution.

Feel free to contact me with any questions or concerns that are not covered, or if you need further clarification concerning the *Xerox Outside Counsel Docketing Guidelines*.

XEROX FILE NOS.
20070891-US-NP
20071047-US-NP
20071224-US-NP

XEROX Liaison Attorney: Lloyd F. Bean
Phone: 585-423-4520 **E-mail**: lloyd.bean@xerox.com

COSTS: Maximum cost of $7,000 for docketing, review, preparation, and filing of each application. Costs are not to exceed that amount without obtaining prior written (e-mail) approval directly from your **Xerox Liaison Attorney**.

Gail M. McMillan
Patent Administrator
Xerox Corporation

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KOCK-YEE LAW

ID 20070891 proposes the use of an array of thermally-isolated and individually addressable "microhotplate" or potentially "nanohotplate" devices (30-100 micron size) to digitally fuse/fix xerographic, liquid and/or direct marking solid ink images. Traditional fusing/fixing systems tend to be thermally inefficient. Much of the energy consumed by the fuser is not directly involved with performing the prime function of melting the toner. Depending on the mass of the fuser and the printed image, it is suggested that as much as 99% of the energy is wasted on warm-up, un-necessary paper heating and the heating of non-image areas. This ID claims that high thermal efficiency may be achieved by digitally applying heat in only the appropriate magnitude and location as predefined by the job profile. /// Retap. Not implemented. Interesting idea but original panel questioned feasibility, especially complexity (how to address and drive the millions of devices) and cost (manufacturability). Microhotplate or micro-heater technologies are known; the difference here is the application and configuration. While current panel questions feasibility of the described system, it recommends filing to try to this form of addressable fusing. Previous IDs A02042, A11365, A21307, and 20051487 described other methods of addressable fusing. Technical Category: Marking and Devices. Rating: 3.

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Invention Proposal

THE DOCUMENT COMPANY
XEROX

Signed hard copy To: Xerox Intellectual Property Law Department

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☐ Wilsonville,OR, 26600 SW Parkway 97070, MailStop: 7053-LAW Send electronic version to your mgr. & copy to: USA.IPLD.OR@mc.usa.xerox.com

1	Proposal Submitted By (Please use legal name) Full First Name, Middle, Last **Kock-Yee Law**		Employee No. **803294**	Outside Phone No. 585- 422-5229
	Organization (Unit/Div./Dept./Section) XG/XRCW/MES&L	Electronic Mail Address **kdaw@xeroxlabs.com**	Bldg. No./ Mail Stop **147-59B**	Fax No. 585-265-5117
2	Proposal Submitted By (Please use legal name) Full First Name, Middle, Last		Employee No.	Outside Phone No.
	Organization (Unit/Div./Dept./Section)	Electronic Mail Address	Bldg. No./ Mail Stop	Fax No.
* 3	Proposal Submitted By (Please use legal name) Full First Name, Middle, Last		Employee No.	Outside Phone No.
	Organization (Unit/Div./Dept./Section)	Electronic Mail Address	Bldg. No./ Mail Stop	Fax No.

* If space for additional submitters is required, please use another sheet; and attach any supplementary Comments.

Manager Don Bott	**Electronic Mail Address** donaldbott@xerox.com	**Bldg. No./MS** 147-59B

Technical Category (see attached list)
3.5, 3.10, 3.11, 4.7

Name of Xerox Program (if any)
Nanotechnology

Opportunity for licensing revenue Who could be interested in it? How is this better than alternatives?
Yes. In addition to our competitors, anyone who heat with a large surface area would be benefit from the technology.

Descriptive title of invention
Digital Fuser Concept using Nano/Micro Hotplate Technology

Describe the problem How was this problem tackled before your invention?
Current fusing systems in marking (dry and direct) are very inefficient energetically. For example, in Gen3, only ~ 1% of the energy is used to fuse the toner into paper, the rest is split between warming up the paper or simply waste. While waste heat can be minimized by better thermal management (insulation, heat exchange and so on), the only way to reduce the amount of heat required to warm-up the paper during fusing is to digitalize the heat delivery, specifically deliver only to where the toner image is. The resulting fusing subsystem/marking engine would be very efficient energetically, green.

Summary of the invention Describe briefly what the invention is and how it works in 5 –8 lines.
Arrays of resistive heaters of the dimension of 30-100 microns have been fabricated as a part of the micromachined arrays for chemical sensing applications, using the conventional CMOS technique at NIST (>10 years ago). These heaters can operate from 20 to 1000C in milliseconds. This has been named micro holplate technology in the field. In this invention, we propose to leverage the micro hotplate technology to digitize the heating process in fusers for both xerography and direct marking. In the micro hotplate technology, each heater can be individually heated and controlled in accordance to the sensor design. Our intention is to apply the know-how to deliver digitalized heat and fusing where you have images. Due to the recent advance in Nano fabrication, we expect that we can even fabricate heater in the Nano scale. This concept should be a key enabler for pixel-addressable fusing technology.

Witnessed and Understood By	Date
Submitter(s) Signature(s)	Date

Describe your invention Describe how to make and use the invention and it's novel embodiments. Cover the process, method, materials with sketches, flow charts, usage etc. What are the advantages of your invention for Xerox?

Figure 1[1] shows a schematic of a large area of arrays of chemical sensors fabricating from the micro hotplate technology.[2] In this particular example, the dimension of each sensor is about 50 microns. Figure 2 shows the cross section of each sensor. Each sensor consists of a micro heating element, a thermometer plate, a contact pad and a sensing film. The entire array is fabricated in a CMOS Foundry using conventional semiconductor fabrication technique. The temperature of each sensor can be independently controlled. Depending on the sensor design/configuration and the materials used, the microhotplates can operate anywhere from 20 to 1000 degree C with a response time of about 4 milliseconds. Reviews of the microhotplate technology for sensor application have been given elsewhere.[2,3]

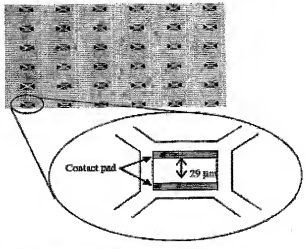

Figure 1. Optical image and schematic illustration of the microhotplate array.

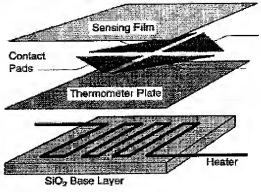

Figure 2 A schematic of the cross-section of a chemical sensor made from the micro hotplate technology.

Witnessed and Understood By	Date
Submitter(s) Signature(s)	Date

In this invention, we propose to leverage and extend the micro hotplate technology for digital fuser or transfix device in dry & liquid xerography and direct marking. We can envision the construction of a large area heating surface consisting of arrays of micro hotplates in our application using a combination of CMOS, printable electronic and Nanofabrication technologies. A concept design of a fusing device is provided in Figure 3. The final fusing apparatus can be in roll or belt configurations depending on the applications, the design and the materials choices. Although the dimension described in this ID is in micron scale, we can easily envision of miniaturizing the heating element to the Nano dimension using today's Nanofabrication technologies in display and printable electronics.

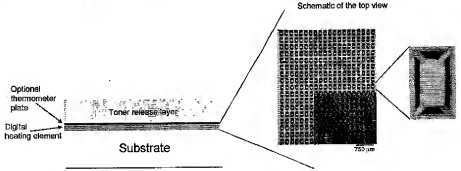

Figure 3 Concept design of a digital fuser using the microhotplate technology (layers shown not in scale)

We claim in this ID the use of micro hotplates for the construction of digital fusing and transfixing apparatuses in dry/liquid xerography and direct marking. We will extend the technology to the Nano scale when needed. We also claim the use of this kind of heating surface as heating element for other larger area heating applications. The advantage here is the improved energy efficiency. Heat is delivered to where it is needed.

References

1. Figure 1 was extracted from B. Panchapakesan, R. Cavicchi, S. Semancik, and D. L. De Voe, Nanotechnology, 17, 415 (2006)
2. S. Semancik and R. Cavicchi, Acc. Chem. Research, 31, 279 (1999).
3. I. Simon, N. Barsan, M. Bauer, and U. Weimar, Sensors Actuators B, 73, 1 (2001)

Witnessed and Understood By	Date
Submitter(s) Signature(s)	Date

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People List names of others known to have worked on this or a similar invention

See references

Related concepts Check the Xerox Patent data base at http://cornip.wrc.xerox.com/cornip/icbuhome.nsf
What have you found in a data base search of the topic? Give patent or IP number of the most relevant items.

See references

Prototype Has a model, a prototype, or experiment of the invention been built, made, run or tested ? ☐ Yes ☐ X No

Xerox product Is the invention used by Xerox or is there a definite plan for use in a future product(s) ? ☐ Yes No
If so, please identify the program(s) or product(s), and introduction dates:

Too early to tell.

Disclosures Has this concept been disclosed to vendors, consultants, outside parties, partners, etc? Indicate the date(s) of any previous or planned future disclosure external to Xerox, and identify the type of disclosure (by agreement, demonstration, paper or presentation given, market probe, published article, etc., and if convenient, please provide a copy of the agreement, paper or article):

No.

Outside funding ☐ YES (Indicate Source of outside funding) ☐ NO

We may partner some of the materials design with DeGussa and other materials vendors.

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Submitter(s) Signature(s)	Date

Patent Management Technical Categories

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(Touch the hi-lighted areas to receive a definition of the category.)

Architecture and Document Services

1.1 Advanced Print Services
1.2 Document Access & Management
1.3 Document Capture & Analysis
1.4 Document Systems Architecture
1.5 Electronic Document Commerce
1.6 Network Document Systems
1.7 Productivity Initiatives
1.8 Process, Workflow, Information Management
1.9 Smart Document Services
1.10 Work Process Analysis

Digital Imaging

2.1 Capture
2.2 Presentation
2.3 Manipulation
2.4 Representation
2.5 Systems

Marking & Devices

3.1 Latent Image Formation (Recharge/Expose Process)
3.2 Development (Developable Process)
3.3 Image Transfer & Fixing (Combined Process)
3.4 Erase And Cleaning (Recharge/Erase Process)
3.5 Direct Image Marking (Ion Deposition)
3.6 Imaging (ROS, Optics, Modulator, Illumination)
3.7 Liquid Ink Jet
3.8 Acoustic Ink Jet
3.9 Continuous Ink Jet
3.10 Dry Ion Spray Powder
3.11 Other Non-Impact Marking
3.12 Controls & Diagnostics (For Marking Systems)
3.13 Media Handling, Binding, Transport, Finishing
3.14 Marking System Integration & Architecture
3.15 Marking Hybrid Processes
3.16 Display Devices
3.17 MEMS Devices
3.18 Data Recording Devices
3.19 Digital Image Scanning

Materials & Materials Manufacturing

4.1 Toner, Developer and Components (For Recharge/Expose Process)
4.2 Photoreceptors and Components
4.3 Dielectric Receivers
4.4 Inks For Direct Marking
4.5 Powders For Direct Marking
4.6 Substrate Media (Paper, Transparencies, Etc)
4.7 Electronic Materials (Light Emitting Or Detecting Semiconductors For Printhead Or Other Use)
4.8 Display Materials
4.9 Materials for Fusing
4.10 Drum And Belt Substrates
4.11 Materials for Binding and Finishing
4.12 Materials of Controlled Conductivity
4.13 Transfix Belt
4.14 Intermediate Transfer Belts
4.15 Magnetic Materials
4.16 Recording Media
4.17 Ink Jet Ink Materials

Manufacturing Technology & Product Elements

5.1 Component Development
5.2 Manufacturing Processes
5.3 Production Systems
5.4 Industrial Design /Human Factors
5.5 Office Electronics
5.6 Product Packaging

Speculative Research

6.1 Document Futures
6.2 Applications outside Defined Xerox Direction

Comment [D1]: 2.1 Captu ... [2]
Comment [D2]: 1.2 Docum ... [3]
Comment [D12]: 2.2 Prese ... [4]
Comment [D3]: 1.3 Docum ... [5]
Comment [D13]: 2.3 Manip ... [6]
Comment [D4]: 1.4 Docum ... [7]
Comment [D14]: 2.4 Repre ... [8]
Comment [D5]: 1.5 Electro ... [9]
Comment [D15]: 2.5 Syst ... [10]
Comment [D6]: 1.6 Networ ... [11]
Comment [D7]: 1.7 Produ ... [12]
Comment [D8]: 1.8 Proce ... [13]
Comment [D9]: 1.9 Smart ... [14]
Comment [D10]: 1.10 Wo ... [15]
Comment [D16]: 3.1 Late ... [16]
Comment [D35]: 4.1 Tone ... [17]
Comment [D17]: 3.2 Deve ... [18]
Comment [D36]: 4.2 Phot ... [19]
Comment [D18]: 3.3 Imag ... [20]
Comment [D37]: 4.3 Diele ... [21]
Comment [D19]: 3.4 Eras ... [22]
Comment [D38]: 4.4 Inks ... [23]
Comment [D20]: 3.5 Expo ... [24]
Comment [D39]: 4.5 Powd ... [25]
Comment [D21]: 3.6 Imag ... [26]
Comment [D40]: 4.6 Subs ... [27]
Comment [D22]: 3.7 Thin ... [28]
Comment [D23]: 3.8 Acou ... [29]
Comment [D41]: 4.7 Elect ... [30]
Comment [D24]: 3.9 Cont ... [31]
Comment [D42]: 4.8 Displ ... [32]
Comment [D25]: 3.10 On ... [33]
Comment [D43]: 4.9 Mate ... [34]
Comment [D26]: 3.11 Oth ... [35]
Comment [D44]: 4.10 Dru ... [36]
Comment [D27]: 3.12 Con ... [37]
Comment [D45]: 4.11 Mat ... [38]
Comment [D28]: 3.13 Mod ... [39]
Comment [D46]: 4.12 Mat ... [40]
Comment [D29]: 3.14 Mar ... [41]
Comment [D47]: 4.13 Tra ... [42]
Comment [D30]: 3.15 Mar ... [43]
Comment [D48]: 4.14 Inte ... [44]
Comment [D31]: 3.16 Dis ... [45]
Comment [D49]: 4.15 Mag ... [46]
Comment [D32]: 3.17 MEI ... [47]
Comment [D50]: 4.16 Rec ... [48]
Comment [D33]: 3.18 Dat ... [49]
Comment [D51]: 4.17 Pac ... [50]
Comment [D34]: 3.19 Dig ... [51]
Comment [D52]: 5.1 Com ... [52]
Comment [D58]: 6.1 Docu ... [53]
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... [57]
... [58]
... [59]

Manager's Comment Section

Submitter(s):
Kock-Yee Law

Title of Invention
Digital Fuser Concept using Nano/Micro Hotplate Technology

Manager's Name	Date
Don Bott	

1. Problem addressed or function provided by the invention:

Example 1A: Finisher cost reduction

Example 1B: Uses low cost LCD to write annotation messages

2. Central thrust of the invention:

Example 2A: Design incorporates fewer parts

Example 2B: Uses low cost LCD to write annotation messages

3. Could invention have impact beyond current description?

Example 3A: Could also function for printer finisher

Example 3B: Could also function to erase/edit copy

4. Potential for Xerox application. Specify product or technology program if possible:

Example 4A: Mainline approach in Program Q

Example 4B: Adds significant feature to future products

5. Value to competitors; potential for license or trade:

Example 5A: Enables much lower cost finishing than any known system and opens possibilities of moving finishing down-market

Example 5B: Could be licensed in a business area un-related to Xerox

6. Please indicate any related patents, publications, or activities you know of:

7. I would recommend the following form(s) of protection: ☐ Patent ☐ Defense publication ☐ Keep trade secret ☐ None

Comments:

Page 5: [1] Comment [D1] Definition

1.1 **Advanced Print Services:** Cross-product print and multi-function standards and coherence; value-add print services software; and software adaptation of current product platforms to the Web and other distributed service environments.

Page 5: [2] Comment [D11] Definition

2.1 **Capture**: Acquisition of an audio, video or electrical image, "front end" image correction and quantization. Includes software to correct for acquisition-induced artifacts, and primary segmentation to assist in the recovery of a clean image. Does not include scanning hardware (sensors, optics, illumination) or A-to-D conversion.

Page 5: [3] Comment [D2] Definition

1.2 **Document Access & Management:** Software and integrated systems for document acquisition, storage, retrieval, and distribution. Includes document creation, translation, content analysis, and engagement with document repositories.

Page 5: [4] Comment [D12] Definition

2.2 **Presentation.** Rendering of an image for display; printing; or visual, auditory, or tactile sensing. Includes rasterization, screening, trapping, antialiasing and software or electronics hardware specifically required by a printer or display, and soft proofing technology.

Page 5: [5] Comment [D3] Definition

1.3 **Document Capture & Analysis:** Technology and software for capture, recognition, and interpretation of the content and structure of scanned (raster) documents. Includes document (OCR) and structure recognition (reconstruction), image indexing and document genre (type) classification, analysis of tables, video analysis, job sheet recognition /interpretation, over-the-desk/meeting image capture, embedded data encoding (glyphs), data compression, and tokenization.

Page 5: [6] Comment [D13] Definition

2.3 **Manipulation:** Analyzing and changing the content and/or appearance of digital images. Includes segmentation, currency detection, editing, content analysis or quality evaluation, descreening, transformation, watermarking or image enhancement.

Page 5: [7] Comment [D4] Definition

1.4 **Document Systems Architecture:** Architecture for document services to achieve product platform coherence. Includes the free flow of documents, service interoperability and composition into document systems, systems administration, security, accounting, and diagnostics.

Page 5: [8] Comment [D14] Definition

2.4 **Representation**: Relating to the form or format of the digital image data. Includes page description languages, document image representations, rendering tags and hints, compression, format conversions, storage and transport.

Page 5: [9] Comment [D5] Definition

1.5 **Electronic Document Commerce:** Software for electronic document commerce. Includes support for negotiating terms and conditions of sale; secure electronic delivery of goods via intellectual property rights management and document protection; inter-enterprise communication system models; electronic accounting and payment.

Page 5: [10] Comment [D15] Definition

2.5 **Systems:** Components and systems for digital imaging rather than operations on the images themselves. Includes color calibration, color table construction, gamut mapping, image path architectures, electronic systems for digital imaging including hardware and ASICs and component design methods.

Page 5: [11] Comment [D6] Definition

1.6 **Networked Document Systems:** Protocols, business models, architectures, and software that support networked document services based on the Internet, including global ATM connectivity.

Page 5: [12] Comment [D7] Definition

1.7 **Productivity Initiatives:** Processes and infrastructure to enhance productivity, time to market and providing state of the art computing infrastructure.

Page 5: [13] Comment [D8] Definition

1.8 **Process, Workflow, Information Management:** Tools to coordinate and manage knowledge processes, and the collection and combination of heterogeneous information.

Page 5: [14] Comment [D9] Definition

1.9 **Smart Design & Service:** Software tools and practices to improve the productivity and reliability of marking engines by improving maintainability and service delivery. Control for Micro Electrical Mechanical Systems (MEMS) for marking engines and paper handling.

Page 5: [15] Comment [D10] Definition

1.10 **Work Process Analysis:** Analysis of work processes involving documents and document related technologies leading to new design requirements, the specification of new markets and to significant enhancements of existing product platforms.

Page 5: [16] Comment [D16] Definition

3.1 **Latent Image Formation (Re-Imageable Process):** Creation of a latent image in electrophotography, ionography, magnetrography or other re-imaging process.

Page 5: [17] Comment [D35] Definition

4.1 **Toner, Developer and Components (For Re-Imageable Process):** The materials, compositions and processing for toners, which are particulate materials with colorant and fixing resin and charge control agents in dry form or in a liquid vehicle for development onto a receptor, and for developers, which are materials packages containing toner particles with dry carrier or a liquid vehicle. Includes materials for xerography, ionography, and magnetography.

Page 5: [18] Comment [D17] Definition

3.2 **Development (Re-Imageable Process):** Development of a latent image in electrophotography, ionography, magnetrography or other re-imaging process by powder or liquid.

Page 5: [19] Comment [D36] Definition

4.2 **Photoreceptors and Components:** The materials and processing for photosensitive receivers, which can be discharged by light, onto which charged particles are developed. Includes photogenerator pigments, transport materials, interfacial materials and manufacturing processes for these materials. Includes photoelectric conversion device materials.

Page 5: [20] Comment [D18] Definition

3.3 **Image Transfer & Fixing (Re-Imageable Process):** Transfer and fixing of a latent image in electrophotography, ionography, magnetrography or other re-imaging process.

Page 5: [21] Comment [D37] Definition

4.3 **Dielectric Receivers:** The materials and processing for dielectric structures charged and discharged by corona onto which charged particles are developed.

Page 5: [22] Comment [D19] Definition

3.4 **Erase And Cleaning (Re-Imageable Process):** Erase and cleaning of a latent image in electrophotography, ionography, magnetrography or other re-imaging process.

Page 5: [23] Comment [D38] Definition

4.4 **Inks For Direct Marking:** The materials and processing for inks for direct marking. Includes TIJ and AIP inks, and phase change inks.

Page 5: [24] Comment [D20] Definition

3.5 **Fixed Image Marking (Incl. Direct To Plate):** Marking techniques that use a fixed image, including direct to plate technology in offset lithography. Includes image formation, development or inking, transfer, fixing, and cleaning.

Page 5: [25] Comment [D39] Definition

4.5 **Powders For Direct Marking:** The materials and processing for toners used in direct marking. Includes toners for ballistic aerosol marking.

Page 5: [26] Comment [D21] Definition

3.6 **Imager (ROS, Optics, Modulator, Illumination):** Imaging subsystem or raster output scanner. Includes optics, modulators, and light sources.

Page 5: [27] Comment [D40] Definition

4.6 **Substrate Media (Paper, Transparencies, etc.):** The materials and processing for plain paper, transparencies, photo-finishing papers and other coated substrates for xerographic, ink jet, and other marking processes.

Page 5: [28] Comment [D22] Definition

3.7 **Thermal Ink Jet:** Drop on demand ink jet, using thermal initiation.

Page 5: [29] Comment [D23] Definition

3.8 **Acoustic Ink Jet:** Drop on demand ink jet, using acoustic initiation.

Page 5: [30] Comment [D41] Definition

4.7 **Electronic Materials (Light Emitting Or Detecting, Semiconductors For Printhead Or Other Use):** The processing and materials used for light emission or detection, electrical current switching devices and semiconductors for print heads or other use. Includes crystalline semiconductors (GaAlINP, GaN for laser diodes), crystalline Si (for TIJ print heads), and amorphous Si (for TFT displays and AIP print heads).

Page 5: [31] Comment [D24] Definition

3.9 **Continuous Ink Jet:** Marking in which a continuous jet of ink drops is deflected in an image-wise fashion.

Page 5: [32] Comment [D42] Definition

4.8 **Display Materials:** The processing and materials for organic electro-luminescent, liquid crystal, electric paper, sol-gel other displays. Includes bichormal particulate materials for electric field rendering and re-imaginable document materials.

Page 5: [33] Comment [D25] Definition

3.10 On Demand Powder: Image-wise deposition of powder. Includes DEP, marks on intermediate media and BAM.

Page 5: [34] Comment [D43] Definition

4.9 Materials for Fusing: Release agents, fuser oils and materials used in rollers or belts used to fuse marking materials to substrates, but not the fabrication processes to manufacture fuser or pressure rollers.

Page 5: [35] Comment [D26] Definition

3.11 Other Direct Marking: Direct marking other than thermal and acoustic ink jet and on-demand powder. Includes piezo ink jet, and direct marking from a donor, such as dye sublimation or wax transfer.

Page 5: [36] Comment [D44] Definition

4.10 Drum And Belt Substrates: The processing and materials for precision structures used to receive and transfer marking materials.

Page 5: [37] Comment [D27] Definition

3.12 Controls & Diagnostics (For Marking Systems): Solutions for integrated control of marking systems. Includes feedback control of marking, sensors, algorithms, embedded microprocessors, modeling and systems architecture (mark facility controller, machine module interfaces).

Page 5: [38] Comment [D45] Definition

4.11 Materials for Binding and Finishing: The processing and materials for supplies used for binding and finishing, such as adhesives, tapes and staples.

Page 5: [39] Comment [D28] Definition

3.13 Media Handling (Feeding, Transport, Finishing): Mechanisms for handling paper and other media. Includes feeding, finishing, registration, transport, media systems architecture and modeling, simulation and software.

Page 5: [40] Comment [D46] Definition

4.12 Materials of Controlled Conductivity: The materials used in electrical contacts, bias charging rolls and bias transfer rolls, with conformability and conductivity properties for applications in bias charging devices and bias transfer devices, but not the processing to fabricate such rollers.

Page 5: [41] Comment [D29] Definition

3.14 Marking System Integration & Architecture: Marking systems architectures and systems engineering integration.

Page 5: [42] Comment [D47] Definition

4.13 Transfix Belt: The materials used in belts with conformability and thermal properties for transferring developed materials and simultaneously fix it to the substrate.

Page 5: [43] Comment [D30] Definition

3.15 Marking Hybrid Processes : Architectures that use combinations of marking processes, such as xerography and ink jet.

Page 5: [44] Comment [D48] Definition

4.14 Intermediate Transfer Belts: The materials used in intermediate belts to which the image is transferred from the photoreceptor with subsequent transfer to paper prior to fusing.

Page 5: [45] Comment [D31] Definition

3.16 Display Devices: Image display hardware and systems.

Page 5: [46] Comment [D49] Definition

4.15 Magnetic Materials: The materials and processing for ferrofluids, thin magnetic films, ferro-electric films.

Page 5: [47] Comment [D32] Definition

3.17 MEMS Devices: Micro electro-mechanical devices, such as those intended for paper handling, marking and other applications, but does not include the software control covered by the "Smart Design" sub-category 1.9.

Page 5: [48] Comment [D50] Definition

4.16 Recording Media: The materials and processing used for data and image recording, including optical, magnetic and heat sensitive materials, printing plates, xero-printing masters and electric paper.

Page 5: [49] Comment [D33] Definition

3.18 Data Recording Devices: Data recording, including optical, magnetic and thermal techniques.

Page 5: [50] Comment [D51] Definition

4.17 Packaging Materials: Designs, processes and materials used to package supplies to individual customers, CRU lines, distribution centers and re-manufacture.

Page 5: [51] Comment [D34] Definition

3.19 **Digital Image Scanning:** Optics, sensors and hardware for raster input scanner (RIS) devices.

Page 5: [52] Comment [D52] Definition

5.1 **Component Development:** Elements from advanced development engineering and materials and process enabled technologies. Includes print heads, fuser rolls, donor rolls, magnetic rolls, sleeves and assemblies and xerographic print cartridge customer replaceable units.

Page 5: [53] Comment [D58] Definition

6.1 **Document Futures:** Concepts that may be related to a Document Company direction, but do not fall within the charter of any existing Xerox business unit or technology portfolio.

Page 5: [54] Comment [D53] Definition

5.2 **Manufacturing Processes:** Manufacturing processes and optimization, such as roll coating processes, advanced assembly methods, injection molding, and precision tolerances for plastics, metals and other materials. Also includes processes for plant safety and environmental protection.

Page 5: [55] Comment [D59] Definition

6.2 **Applications outside Defined Xerox Direction:** Concepts with application outside existing Xerox business units or targeted business interests, and should be considered for either new business initiatives or external licensing.

Page 5: [56] Comment [D54] Definition

5.3 **Production Systems:** Improvements related to factory simulation and modeling, shop floor control systems, test technology, automated copy quality analysis, visual control networks, and signature analysis tooling.

Page 5: [57] Comment [D55] Definition

5.4 **Industrial Design / Human Factors:** Product-related ID/HF elements, including product appearance, user interface product safety and ergonomics.

Page 5: [58] Comment [D56] Definition

5.5 **Device Electronics:** Electronic devices, ASICs and circuit board assemblies. Includes electrostatic voltmeters, device driver boards and power supplies.

Page 5: [59] Comment [D57] Definition

5.6 **Product Packaging:** Designs, materials and process for the packaging of products other than supplies.